

FIG. 26.—Thin transparent section of the first cervical sympathetic ganglion of a fœtus six and a half months old, showing the structure of the capsule.

FIG. 27.—External surface of a capsule, showing the network or plexus of nervous fibrillæ, also the bundles of fibrillæ arising from it, and joining a neighboring nerve bundle.

The above figures are magnified 420 diameters, with the exception of the first three.

ART. II.—THE ABUSE AND USE OF BROMIDES.

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MR. PRESIDENT AND GENTLEMEN: The time allowed by custom for the reading of a paper before a medical society, will not permit me to treat the subject of the abuse and use of bromides as fully as its importance deserves. I shall only be able to consider the salient points of the topic, almost restricting myself to what I have observed in this branch of therapeutics.

The paper will consist of two parts. The first devoted to a study of bromism, or intoxication by the bromides; the second to a succinct statement of my own method of using the bromic salts in the treatment of epilepsy and other neuroses.

Bromine (from *βρωμος* a bad smell,) was discovered in 1826 by a French chemist, Balard, and to him we also owe the production of the bromide of potassium.

Bromide of potassium appears to have been soon tried by physicians, but it was not until 1840 that its physiological and true therapeutical effects were first apprehended. This was by a German, Otto Graf.²

1 Read before the New York Medical Journal Association, April 25, 1877.

2 De Kali bromati efficacitate interna experimentis illustrata. Lipsiæ 1840. (From Voisin's Essay.)

In 1850, Huette,¹ of Paris, read to the Societie de Biologie a remarkable paper, which may be considered as the basis of the modern use of the bromides. Huette observed and accurately described the general sedative effect of the bromides; their depressing action upon the sexual organs; the anæsthesia of the palate and throat, the mental torpor, the disorders of mobility, and the cutaneous anæsthesia produced by the drug. He also determined (against a number of physicians) its uselessness in late syphilis. Huette may, consequently, be rightly considered as having been the first to describe mild bromism.

With respect to the use of bromides in neuroses, and especially in hysteria and epilepsy, it is generally admitted that Sir Charles Locock² was its originator and advocate, and that Brown-Séquard did the most to systematize and render successful the bromic treatment of epilepsy. For further historical considerations I would refer to Auguste Voisin's excellent essay published in 1875.³

From this time (1857) the bromides have been used by an increasing number of physicians in an almost endless list of diseases and symptoms. Among these may be mentioned, Hysteria, Epilepsy, Infantile Convulsions, Puerperal Convulsions, Sexual Excitement, Chorea, Tetanus, Delirium Tremens, Insanity of active form, Melancholia, Cerebral Excitement and Insomnia, Somnambulism, Vomiting, Headache, Diabetes, etc., etc.

This general use of the various bromides (of potassium, sodium, ammonium, lithium, camphor, etc.,) was largely empirical; the medicine being prescribed because of its quieting effects, and without strict regard to its physiological action.

From 1867 to the present time numerous researches upon the effects of bromides upon the healthy organism have been made by competent observers in various countries,⁴ and since

¹ Recherches sur les propriétés physiologiques et thérapeutiques de bromure de potassium. Mém. de la Société de Biologie. 1850, Vol. II., p. 19.

² The Lancet. 1857, I, p. 528.

³ De l'emploi de bromure de potassium dans les maladies nerveuses. Paris, 1875.

⁴ For *résumé* of physiological action consult H. C. Wood's Treatise on Therapeutics. Philadelphia, 1874; p. 278, et seq.

the publication of these papers there has been, I believe, a more rational and moderate use of bromic salts.

The most important conclusions reached by these physiologists respecting the *modus operandi* of the bromides, are two in number. According to some, (Brown-Séquard, Amory) the bromides act by causing contraction of arterioles and consequent diminution in the amount of blood in the nervous centres; while according to others, (Eulenberg and Gutmann, Laborde, Wood) they affect the nervous tissues directly. All agree, however, in considering the physiological result of the action of the bromides, to be lessened irritability of the nervous centres, especially in the motor tract.

I cannot, of course, now enter upon a discussion of this question, which is really only one phase or face of one of the greatest questions in medical philosophy; viz., whether biological processes are more dependent upon vascular (vaso-motor and hæmic) changes, or upon varying degrees of cellular activity, but I may be allowed to give it as my opinion that the bromides act mainly in the second way referred to; viz., by an action upon the anatomical elements (ganglion cells, chiefly,) of the central nervous system. This belief is based upon physiological experiments in animals, clinical observations in man, and largely, also, by the phenomena of bromism; which last are, it seems to me, quite inexplicable by the first, or vascular theory of the action of bromides.

Chiefly, in consequence of the prevalence of the empirical notion that the bromides are called for whenever there is excitement, and partly, also, because of the extreme application of certain theoretical views concerning the physiological and pathological importance of changes in the amount of blood in the brain and spinal cord, there has been, and is still, I believe, a great abuse or over-use of the various bromides, and it is not seldom that we meet with patients who have been kept in a condition of impaired nutrition and nervous atony for months or years, by means of these medicines, and with others (less numerous) who present the toxic symptoms of the drugs, who have bromism, so-called.

The remarks which follow upon the abuse of the bromides, are naturally divisible into three sections: 1, concerning the

general description of mild and of severe bromism; 2, respect the complication which bromism may cause in diagnosis; and, 3, with reference to the legal aspects of bromism.

I. Bromism of varying degrees. In a number of cases, I have observed the following symptoms superadded to legitimate symptoms of disease; general debility, with weak pulse and coldness of the extremities; a tendency to stupor; slight difficulty in speaking, partly due to an aphasiiform state; the bromic breath and acne. These persons were weak, anæmic individuals, who had been given the bromides for the relief of certain head symptoms, which were quite gratuitously supposed to be due to cerebral congestion. In some of these cases, moderate doses of the drug had been taken for long periods of time, with frequent temporary relief to some symptoms. Yet all the while the patients' general condition had been kept below par, in spite of tonics and selected food. I have observed the same mild bromism, without any real improvement, in some cases of hysteria and hystero-epilepsy. Again, in melancholia, a disease in which cerebral nutrition is quite surely lowered and perverted, I have known injurious effects follow the prolonged use of bromides. In addition to the instances enumerated, there is a large class of patients who, without having any definite disease, suffer from nervousness, imperfect sleep, queer sensations about the head, and who constantly over-estimate their symptoms, and to whom the physician or druggist says, in an off-hand manner, "take a little bromide."

It may be said that often the giving of the bromides in the above manner does not produce positive ill effects; but to this I would reply, first, that from what we know of the physiological effects of the bromides, such dosing must produce a general depression, or lowering of vitality, which few patients can tolerate; and, second, that, on general principles, physicians are in duty bound to give no superfluous or non-indicated drug to their patients.

Bromism may be much more severe than depicted in the above statement; it may attain the dignity of a distinct morbid state, with a clear symptomatology, a well-known course, and I am disposed to think, a central lesion. Huette, in 1850, gave a partial picture of this severe intoxication, and

Prof. William A. Hammond has furnished us with a fuller representation of all its graver details.¹

The chief symptoms of this condition are:

Cerebral: there is a gradually increased stupor, and dullness of intellect; language is impaired; failure of memory and difficult articulation; the memory is much weakened generally, hallucinations, delusions, and even delirium may supervene.

Spinal: general debility becomes marked paresis, and a staggering gait, like that of an intoxicated person, is developed; the facial and other muscles are tremulous; the reflex functions of the palate and throat are abolished; general cutaneous and mucous sensibility is much dulled; the pupils are wide and sluggish; the facial expression idiotic or maniacal; the menses reduced or arrested; the virile power reduced, etc.

Vaso-motor and trophic: the heart beats feebly; the arteries carry less blood and show less impulse; the peripheral circulation is sluggish and the extremities cold; the breath is foul and quite characteristic; the skin of the face and body is covered with acne; the skin and mucous membranes are dry; the saliva scanty and sticky; sometimes ulcers or a rupia-like eruption shows itself on the extremities.

These symptoms may be so aggravated as to simulate dementia, mania, or general paralysis of the insane; and even death may ensue from extreme debility.

I desire particularly to insist upon the resemblance between bromism and general paralysis of the insane. In both we observe tremor of the facial and lingual muscles, producing a peculiar vibratory speech; in both there is an uncertainty in the performance of certain movements, as walking or using the hands for fine work; in both there is a failure of intellectual force and of memory. Even somewhat exalted notions may be present in bromism, though this is rare. In general paralysis we have other important symptoms, such as contraction and inequality of the pupil, sexual excitement, peculiar epileptiform seizures, remarkable remissions in the symptoms,

¹ On some of the Effects of the Bromide of Potassium when administered in Large Doses. *Quarterly Jour. of Psychological Medicine*, II. 1869. p. 46.

and often good physical health, with tense arteries; all these symptoms being wanting in bromic intoxication. Severe bromism is, I am happy to say, very seldom produced, except during the early stage of the treatment of obstinate epilepsy, chiefly for the reason that the doses given for other affections are insufficient to bring about such a result, in the majority of persons. Dr. Hammond believes that bromism is rarely produced by doses less than thirty or forty-five grains of the bromide of potassium daily, and my experience would lead me to a similar estimate.

Occasionally we deliberately produce severe bromic intoxication. This is done in some severe cases of epilepsy, though even in these we seldom go farther than creating a state intermediate between the two conditions I have described. Again, bromism has been proposed as a cure for the morphine habit, or mania. Dr. Geo. M. Schweig,¹ of New York, has published a most interesting case in illustration of this procedure. The medication is certainly very heroic; but it is doubtful if any treatment not imminently dangerous to life, is not acceptable in such a terrible malady as the opium habit. Dr. Schweig's paper is, furthermore, an admirable study of the severe effects of the bromides.

II. Bromism as a complication in diagnosis.

The following case is related by Voisin.²

A patient who had been under treatment for epilepsy became, as his physicians thought, insane, and was sent to Paris to consult Voisin. The patient was found at a hotel in a state of violent mania, beset by frightful hallucinations of hearing, and shouting loudly. Later there was stupor, loss of memory, of affection, and of appetite; the walk was oscillating, and all movements were irregularly performed. Titillation of the nares and throat showed complete loss of reflex action, the hands were tremulous, and the facial and lingual muscles were the seat of fibrillary contractions. The pupils were equal, and the symptoms had developed very acutely after the use, during some months, of potassium bromide in doses of 90 to 120 grains. The medical officers of an asylum in which

1. Cure of the Morphine Habit. *New York Medical Journal*, May, 1876, p. 495.

2. *Op cit.* p. 68.

Voisin placed this patient, thought he was mistaken in his diagnosis of bromism, and in his favorable prognosis; they looked upon the case as one of general paralysis of the insane.

In a week after the cessations of the bromides and the use of vapor baths, purging, black coffee, etc., the symptoms subsided, and in thirteen days the patient was sent back to his home in the country, quite well.

In a case which I saw in consultation, the addition of bromism to other symptoms led to the diagnosis of cerebral lesion of the gravest kind, when really only the basal dura mater was involved. The following is a summary of this to me, instructive example of the evils of the purposeless giving of the bromides in large doses.

I was sent for to see Mrs. X. in a country town, near New York, on October 18th, 1875. She was under the care of a very intelligent practitioner, and had been seen by a prominent oculist of New York. I learned that this lady, then aged fifty-five years, had enjoyed good health during her adult life. In 1863, in Europe, she had an attack of mydriasis on the right side, without diplopia, or ptosis, or lesion of the fundus, or headache. This disappeared in three or four months. In 1870, having been well during the interval, while again in Europe, experienced internal strabismus of right eye with diplopia, but no pain. An oculist of Naples performed tenotomy of the internal rectus without relief. She had not then (and has never had) neuralgic pains in the legs, osteoscopic pains, sore eyes, or sore throat; never was dizzy or faint. In 1872 had pain in the head for the first time, in the shape of neuralgia of the right supra-orbital nerve. This pain has been present ever since with great variation in intensity. Patient was often awakened by severe pain at 3 or 4 o'clock A. M. The pain soon affected the whole of the right temporo-frontal region, with some extension into the eyeball and orbit. About one year ago, (1874) and often since had tingling in all the superficial branches of the right trigeminus. No irritation of the acoustic nerve. During the past year the sight of the right eye gradually failed, and slight exophthalmus appeared. Returned to America about one month ago and was fairly well on board ship. Soon after landing, the

local head and brow pains became much more severe, the pain apparently shooting through the right anterior lobe of the brain. There was no ptosis, but the eyeball was fixed in internal strabismus, without dilatation of the pupil. Bromide of potassium was then given internally in doses of 60 and 90 grains per diem, blisters were applied behind the ears, and morphia exhibited. Patient became weaker. On Oct. 1st, ptosis appeared, there was only perception of light in the right eye; vision normal in the left eye. The bromide of sodium was then substituted to the potassium salt, and given in doses ranging from 90 to 180 grains per diem. Patient grew weaker and weaker, was stupid, used wrong words, staggered while standing or walking; hands were tremulous. Oct. 12, bromides stopped and the iodide of potassium given in 10 grain doses three times a day. About this time slight anæsthesia of the right brow was discovered.

I found the patient, on the 18th, in a state of hebetude, speaking a little thickly and slowly, and quite often using the wrong word. She is perfectly intelligent. There is an abundant flow of buccal saliva and nasal mucus, but no acne. The left side of the face and the tongue are normal. Smells with both nostrils. On the right side there is ptosis, and on raising the eyelid the eyeball is found immovable nearly in the median line, its pupil of medium size and fixed; only perception of light on this side. The ophthalmoscope shows simple atrophy of the optic nerve, there is no choking of the disk and no trace of hæmorrhages in the retina. The fundus of the left eye is normal, and its vision is good; field not impaired. The seat of pain is as described above. The brow, temple, and fronto-parietal region on the right side are partly anæsthetic. There is no palsy of the face or extremities, no anæsthesia of fingers, no referred sensations (numbness, etc). The walk is titubating but not hemiplegic. Patient repeats that she has never lost consciousness. Her pulse is regular, beating 80 in the minute, and her buccal temperature is 98° 9 F. The attending physician and the consulting oculist had concurred in diagnosing a tumor in the right middle fossa of the skull, involving the brain.

My own conclusion was that we had to deal with an inflam-

matory affection of the dura mater in the right middle fossa of the skull, compressing the nerves, etc., which pass through the optic and anterior lacerated foramina, and not involving or affecting the brain substance. The cerebral symptoms present seemed to me to be those of bromism, partly by their intrinsic characters and mode of appearance, and partly because they were not those which a lesion at the base of the brain, on the right side, could produce. Furthermore, I rejected the idea of a cerebral lesion because of the absence of hemiopia and of lesion in each eye, of hemiplegia on the opposite side, both of which symptoms a tumor in the middle fossa must of necessity produce by pressure upon (a) the right optic tract and (b) the right crus cerebri.

As to the nature of the inflammation, I gave no opinion; the social position of the patient, her blooming family of children, and her own medical history previous to 1870, being, opposed to a syphilitic theory. Still I considered that we were in duty bound to give her the benefit of the doubt, and I urged the attending physician to continue withholding the bromides, to give the iodide of potassium in gradually increasing doses, to relieve the pain by hypodermic injections of morphia, and to support the patient with food and stimulants. It will suffice, for the present purpose, if I state that after the half ounce of iodide of potassium per diem was reached and passed, improvement began and progressed rapidly. The medicine was carried up to ʒvi. a day, and held at that dose for some time, then gradually decreased; doses of ten grains being taken as late as the spring of 1876. The symptoms of supposed cerebral lesion passed away in a few days, and the local symptoms gradually disappeared except the atrophy of the optic nerve. I met this lady a few months ago, and she seemed in perfect health, with the exception of slight imperfections in the movements of the right eyelid and eye-ball, and of loss of vision in the eye.

It would be easy for me to relate other cases, illustrating the proposition that bromism may embarrass diagnosis, but my space is limited, and the two examples given above are perhaps sufficiently demonstrated.

I should add, however, that apart from the above special

symptom-groups, the use or abuse of bromides may give rise to a condition of general debility, and to a weakness of the heart, which are not then by any means as serious as when not produced by the bromides.

III. Bromism in its medico-legal aspects.

I am not aware that bromism has ever been brought into the courts as a matter for study and decision, but it may eventually be so under several circumstances.

First, with respect to the responsibility of the physician administering the medicine which so debilitates a patient, physically and mentally, as to expose him to various mishaps. For example, I know of a case in which the patient, suffering from acute bromism, fell asleep in a railway station, and was robbed of four hundred dollars, so great was the stupor produced by bromides, by thieves who undoubtedly wondered at the man's indifference to their manipulations. Dr. Hammond¹ relates, in his essay on Bromism, the case of a gentleman, one of his patients, who was arrested on the street for drunkenness, and locked up over night in spite of the doctor's remonstrances and explanation.

Second, as to the patient's responsibility for criminal acts committed while brominized. It is perfectly possible that such a patient shall take from a store articles not paid for, through defective memory; that he shall be mistaken in the identity of persons, and thus be led to be improperly familiar or abusive; or that he shall enter a house or room not his own, etc.

Third, with respect to the legal capacity, both for ordinary business and for testamentary disposition, of brominized persons. Each case will, of course, have to be studied by itself, but it must be admitted that in some cases of bromism, the stupor, loss of memory, and aphasic difficulty are so great that the patient is, for the time being, as truly *non compos mentis* as if he had a natural secondary dementia.

A decision will be the more difficult to reach, because in mild and in moderately severe bromism the judgment and general intellection are remarkably well preserved, behind a veil of striking superficial symptoms, as impaired articulation,

¹ Journal of Psychological Med. l. c.

stupid expression, staggering gait, partial weakness of memory, muscular weakness and tremor, etc. Again, in some cases, it will be necessary to make a close analysis of the patient's antecedents, in order to clearly ascertain how much of the mental impairment depends upon the medicine, and how much upon the disease for which the medicine was prescribed or taken.

Fourth, with reference to the production of death through bromism. This idea is suggested by reading a case of fatal bromism related by Clarke and Anory,¹ in which a nurse, literally applying orders given him by a physician, continued giving enormous doses of bromide of potassium in spite of progressive weakness. When seen by Dr. Clarke, the patient was past recovery, and sank in a week.

There is a possibility that this procedure may some day be repeated with criminal intentions; *e. g.*, for the purpose of getting rid of a burdensome and incurable invalid.

I shall now proceed with the second part of this paper; viz., a statement of my own mode of using the bromides in the treatment of epilepsy and other neuroses.

In prescribing the bromides for Epilepsy, I have been guided by ideas, which can, perhaps, be best expressed in the form of terse propositions.

1. In view of what we know of the physiological and toxic effects of the bromides and in accordance with either of the two generally received hypotheses of their *modus operandi*, anæmia and debility, or congenital feebleness, contra-indicate prolonged use of the bromide.

2. The bromides are, on the contrary, well borne by persons of fairly full habit and good nervous power.

3. The bromides are indicated in cases of abnormally great irritability of the nervous system, in its motor (muscular and vaso-motor,) and ideational tracts.

4. Epilepsy is so serious a disease, one which, if not interrupted, kills the patient, or reduces him to dementia, that we are justified in using unusual and heroic measures in its treatment. Hence, the contra-indications named above are to be

¹ The Physiological and Pathological Actions of the Bromide of Potassium, Boston, 1872, p. 62.

much less regarded in the management of this formidable neurosis.

5. As a corollary to the last proposition, I may state that I consider epilepsy to be the only disease for the cure of which we are justified in deliberately producing a degree of bromism.

My method of prescribing the bromides in a common case of "idiopathic" epilepsy, is the following:

I employ one of two solutions, made according to a standard formula.

| | | | | |
|---|------------------|---|---|------|
| R | Potassii bromidi | - | - | 3i |
| | Ammon. bromidi | - | - | 3ss |
| | Aquæ font. | - | - | 3vij |

M

S. To be given by the teaspoonful;

| | | | | |
|---|----------------|---|---|------|
| R | Sodii bromidi | - | - | 3j |
| | Ammon. bromidi | - | - | 3ss |
| | Aquæ font.- | - | - | 3vij |

M

S. To be given by the teaspoonful.

These simple solutions, which I have found much more palatable to most patients than those made with infusions or syrups, contain forty-nine doses; i. e., each teaspoonful contains ten grains of the potassium or sodium bromide, and five grains of the ammonium bromide.

The solution is given several times a day, nearly always so divided as to give by far the largest dose in the evening. This is Brown-Séquard's rule, and the principle involved is to keep the system thoroughly under the influence of the drug during the night.

I direct for an adult male epileptic, that a teaspoonful shall be taken before each meal, and two teaspoonfuls at bed-time, largely diluted. In the case of delicate males and of females, I at first prescribe only a teaspoonful before two meals, and two teaspoonfuls at bed-time, and in some young persons or very small and tender adults only, one dose before breakfast, and then at bed-time. The patient taking these initial, or trial doses is carefully observed, the sensibility of the palate and

throat frequently studied, and information obtained from the patient and his friends as to the absence or presence of stupor. Guided by these signs, or their absence, I cautiously increase the bromide, still keeping the nocturnal dose the largest, until slight bromism is produced, as evidenced by absence of reflex movements in the throat, and slight stupor. I pay but little attention to acne. During the rest of the treatment, I aim to give the patient just as little bromide as shall prevent attacks of epilepsy, yet I nearly always find it necessary to keep up slight bromism for months.

The precise amount required per diem in a given case can only be determined by careful observation of that case, and is not to be deduced from general experience. At times, remarkable idiosyncrasies are observed which inexplicably render the patient very susceptible or very rebellious to the bromic influence. Very many of my patients take, month after month, one dose (fifteen grains of the two bromides) before each meal, and three doses, (forty-five grains, at bed-time); a total of ninety grains. As extremes illustrating peculiarities, I may cite the case of a girl of twelve years, who, for weeks took one hundred and fifty grains per diem without bromism, and that of a young lady of twenty, who was decidedly influenced by one teaspoonful before breakfast and two at bed-time; a total of only forty-five grains per diem. In the latter case, had I given the usual doses taken by adults, I should have produced severe bromism.

With respect to children I find that they tolerate the bromides (and iodides as well) in relatively large doses, and little patients of mine often take sixty grains of the bromides a day; while to mere infants I give (after careful trial of smaller doses) twenty to forty grains a day.

It appears to me very important to thoroughly dilute the bromides, in order to facilitate their absorption; I usually direct that the dose be taken in a wineglassful or half a tumblerful of water. Furthermore, I give the medicine on an empty stomach.

With respect to the practice of giving a very large dose at bed-time. Theoretically, upon physiological grounds, it appears right to obtain the greatest bromic action in those hours

when the reflex power of the motor part is probably heightened, and when epileptic seizures often occur; and, again, as a great number of hours must elapse before another dose can be taken, it seems right to give an extra large amount to keep up the medicinal effect. Empirically there can be no doubt of the great importance of this rule. Brown-Séquard's extraordinary success in the treatment of epilepsy was in part due to this, and I have several times seen patients who had been taking a large amount of the bromides in three equal doses without much improvement, and who have had fewer attacks immediately after subdividing the same amount in such a way as to give a large dose at bed-time. For example, thirty grains three times a day did a little good, but fifteen grains before each meal and forty-five grains at bed-time checked the disease much more.

Another of the reasons of Brown-Séquard's success was his positive direction that under no circumstances should the bromides be discontinued; and I have always studiously followed his teachings in this matter. The bromides may be *diminished* but never *stopped* until the word *cure* can be pronounced. Even during intercurrent acute diseases, as colds, fevers, accidents, the bromides should be given regularly, though in reduced doses, partly because the nervous system resists less in that condition, and partly because such attacks of illness, or accident, interrupt the epileptic habit. The omission of the bromides for a very few days may allow a fit to occur, and thus destroy the good work done by months of patient care.

How long must the bromides be taken in epilepsy? This is a question to which we can as yet give no answer. Brown-Séquard and Voisin give it for at least three years *after the last attack*, and I think that this is a minimum of time. I have twice been grievously disappointed by the return of attacks after an immunity of over two years, and others have known recurrence to take place after even a longer period.

Some patients who have had epilepsy for many years are partially demented, and take the bromide unkindly; they become irritable, feeble, and have nearly as many attacks as without the drug. In such cases parents will often ask you if it is worth while to give the bromides systematically, and to bear

with the bromic symptoms. I generally answer this question negatively, yet state to the parents that as the patient may die in a paroxysm it is our duty, on general principles, to do anything which shall diminish that risk.

It will be inferred from the foregoing that I rely upon the bromides of ammonium, sodium, and potassium, for the treatment of epilepsy, and this is in one sense so.

No medicine, it is now generally admitted, has such power over the epileptic habit, and does good in so many cases, as the bromides, and it would seem as if the day for trifling with such doubtfully efficacious medicines as zinc oxide and sulphate, copper sulphate, belladonna, strychnia, setons, diet, etc., had passed away. With the bromide of calcium, lithium, zinc, and arsenic, I have had little or no experience. The last named is loudly vaunted by Clemens, of Frankfort on the Rhine.

I would not, however, have it understood that I employ *only* the bromides in the treatment of epilepsy. On the contrary, what measure of success I have is owing in part to the fact that I made a large use of other means, together with the bromides; and this seems to me so important that I shall take the liberty of digressing a little to specify what this adjunct treatment is.

In the first place, I employ means which tend to counteract the unpleasant effects of the bromides.

The acne may to a certain extent be prevented by administering arsenic from time to time, either in the shape of the solution of arsenite of potassa, or of arsenious acid. Sulphur ointments, mercurial plaster, alkaline lotions, may also be employed.

The general debility or slight paresis produced by the "continuous dose" (Clarke) of bromides, is corrected by strychnia, by nux vomica and zinc oxide, and by quinia. Drowsiness and the more serious symptoms of bromisms are relieved by inhalation of nitrite of amyl, by stimulants, and by quinia. The anæmia and general depression of the vital functions produced in the course of the management of a case of epilepsy, I meet by care in giving the patient nutritious diet, by giving cream or cod-liver oil, and by administering such

medicines as iron, quinia, phosphorus, strychnia, with nitro-muriatic acid, wine, beer, or whisky, and by regulating the patient's hygiene.

Important hygienic rules in the treatment of epilepsy, are the avoiding of large meals at night, regulating the function of the bowels, kidneys, and skin, early rising, and great moderation in sexual gratification.

In the second place, I employ, in some cases, a few medicines which act more directly upon the morbid state of the nervous centres. These are belladonna, cannabis indica, oxide of zinc, strychnia, sulphates of zinc and copper, etc. My favorite is the first named, and I have known the best effects to follow its association with the bromides. For example, a patient passed into my hands after having been a long time under the treatment of a distinguished physician with a moderately good result; under a given quantity of the bromides she had attacks about fortnightly. I did not increase the bromides or change the method of taking them, but at once gave extract of belladonna in doses of gr. $\frac{1}{4}$ three times a day. The patient acquired a dryness of the throat, and the attacks were reduced in frequency to once a month, once in two months, three months, and she has now been thirteen months without an attack. Of course the belladonna was not continued during all the two years of treatment. At first it was used for two or three months in succession, and afterward given from time to time.

During the many months or years of the treatment of a case of common epilepsy, I ring the changes on the medicines above enumerated; nearly always giving something in addition to the bromides. And I may be allowed to repeat that the bromides, though often changed in amount, and sometimes in kind, are never withheld.

The treatment of cases of epilepsy in which a definite causative lesion can be made out, is of course somewhat different. I refer now to epilepsy due to syphilitic lesions, to peripheral disease, to cranial and neural injury, etc. In these varieties, I use the bromides to combat the epileptic habit, to prevent discharges (using Hughling Jackson's phraseology), and at the same time meet the special indication by using mercury and

iodide of potassium, by correcting visceral disease, by removing some external irritating cause, or by an operation like trephining, neurectomy, etc.

In other neuroses, I have used the bromides sparingly, and never continuously.

Hystero-epilepsy and hysteria have not seemed to me much benefited by the bromides. As far back as 1857, Locock remarked that the bromide of potassium was especially successful in hysteria of distinctly ovarian or uterine origin. I would not condemn the use of the bromides in hysteria, but would protect against its being given in such a manner as to produce bromism.

Delirium tremens is probably shortened by the free use of the bromide, while Home Physician to the New York Hospital I treated, under the directions of the Attending Physician many cases of this disease with doses of forty and sixty grains, repeated two and three times in the course of the evening. It was our belief that in cases uncomplicated by visceral disease, we thus rapidly produced sleep.

Insomnia I think, is often treated by bromides, upon the purely hypothetical indication of causing anæmia of the brain—an indication reposing upon insufficient physiological experimentation, and upon belief in the notion that the bromides directly produce cerebral anæmia. Many cases so viewed might be much more quickly relieved by chloral, or by a glass of ale, or by correcting indigestion. A case of well-marked insomnia needs, it seems to me, to be investigated in the broadest manner, without failing to keep in mind that this symptom may depend upon a number of pathological conditions. As to the immediate cause of sleep, I believe it to be due partly to the waste of tissues generally, and the presence in the blood of an accumulation of the products of retrograde metamorphosis (Preyer's theory), and partly to the exhaustion of the cerebral tissue itself. The anæmia which is observed in the brain during sleep is, it appears to me, a concomitant, or consequent phenomenon, in obedience to the general law that a tissue in repose contains less blood than one in action.

Insanity is often, I believe, erroneously treated with the

bromides. I have several times seen patients with melancholia made weak and wretched by large doses of the bromides which failed to make them sleep; and in mania I have known precious time wasted in vain attempts to get sleep by these medicines. I would only employ the bromides in insanity to meet a few indications, such as a tendency to epileptiform attacks, or abnormal sexual excitement, or great nervousness not caused by delusions.

I have not used the bromides in Chorea and Neuralgia. It is vaunted in migraine, but in some half dozen cases in my practice it has given absolutely no relief to the attack. Extreme irritability of the bladder with pain, in a female, was very greatly relieved by a retained vaginal injection of Si bromide of ammonium. The idea was to produce anæsthesia of the vagina and vulva. Upon a similar principle we all use gargles of bromides in neuralgic or myalgic sore-throats, and in the cough of laryngeal irritation, with fair success. Vomiting in pregnancy, after morphia, ether, etc., may be arrested by a judicious use of the bromides. It has been proposed to give bromide of potassium an hour or so before administering ether, or giving opium or morphia, with the view of preventing nausea and vomiting. This practice has seemed successful in my hands also.

Hay-asthma, or hay-cold, is a disease for which multitudes of medicines have been tried, without much good result. Last year, I induced two or three persons suffering from this disease to employ a strong gargle of bromide of ammonium, and to wash out the nasal passages with a weak solution of the same salt several times a day during the attack. The result was so gratifying that I am disposed to ask physicians to give a fair trial to this treatment during the coming summer and autumn. The gargle to be of the strength of Si or Siij of bromide to 3j water; the solution for the nares much weaker, of from 10 to 30 grains of bromide in 3j water.¹

¹ New York Medical Record, Nov. 11, 1876. p. 757.